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EDITORIAL

Xpert implementation in challenging scenarios: a brand-new car running on the same bumpy old roads

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> *« Ce qui mène et entraîne le monde, ce ne sont pas les locomotives, ce sont les idées. »*
> 'What leads and pulls the world along is not machines, it is ideas.'
>
> Victor Hugo (1802–1885)
> French poet, novelist and dramatist

For the last 8 years, the Xpert assay has represented the first major advance in tuberculosis (TB) diagnosis since sputum smear microscopy, which dates from the nineteenth century. Since its endorsement by the World Health Organization, most countries have quickly started rolling Xpert out under programme conditions. Scale-up of the test has created a qualitative jump into molecular diagnosis in TB, no doubt the way forward, just as it is for human immunodeficiency virus (HIV) infection. The use of molecular technology is a unique opportunity to increase the sensitivity of TB diagnosis in those patients in whom TB has remained invisible on smear microscopy: children, HIV-infected individuals and paucibacillary and extra-pulmonary TB. These technologies also provide quicker and probably more reliable information on drug resistance, giving results in hours with the potential to 'test and treat', i.e., starting treatment for drug-resistant TB on the same day, even in decentralised contexts.[1]

The latest versions of Xpert offer further improvements: Xpert-Ultra cartridges present even higher sensitivity (closer to that of liquid media), and are a fantastic tool for diagnosing paucibacillary TB and lethal presentations such as TB meningitis;[2] Expert Omni is a completely portable device, closer to a point-of-care test; and Xpert Xpand is a new generation of cartridges able to diagnose common mutations conferring resistance to isoniazid, fluoroquinolones and second-line injectables, making the diagnosis of extensively drug-resistant TB (XDR-TB) quicker and much simpler.[3] More advances and devices based on molecular biology are certain to appear in the years to come, and will probably transform our conceptual way of diagnosing and treating TB.

However, all of these potential technological advances will only be able to happen if the structures for supplies of consumables, maintenance, sample transportation and basic coordination and communication exist. Unfortunately, as the study by Gidado et al. in this issue of *Public Health Action* shows, just having the machine does not necessarily translate into great improvements at regional or country level.[4] Gross underutilisation of Xpert and high rates of errors were found in different sites in Nigeria. This is not an isolated experience, and not the first study that underpins serious problems limiting the impact of the roll-out of Xpert.[5]

Purchase of the machines is often the start and end of the investment; however, introducing new technology involves additional costs that are usually underfunded by programmes. Lack of access to life-saving diagnostic technology is obviously a problem. However, the implementation of such technologies in weak health systems will not necessarily translate into significant clinical impact. Investment in technology is attractive for donors and programmes; buying the device is quick and easy to justify. However, on its own the machine is doomed to fail in the absence of wider investment in implementation plans, coordination, a continuous supply chain (drugs and consumables), quality assurance, maintenance/calibration, and trained, effective and committed human resources with supportive monitoring and evaluation, working with simple and reliable recording and reporting systems.

The above are the historical pillars of the DOTS and DOTS expansion strategies. They are also part of basic health systems strengthening, a still very much needed and seriously underfunded aspect of TB programmes. Revitalised and modernised by the new technologies, these solid, landmark ideas could achieve a lasting impact in patients' lives and in country programmes.

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